Rethinking Assessment

University of BRISTOL
Graduate School of Education

Discussion paper 2:

Integrating the formative and summative through technology enhanced assessment

Q: Can technology enhanced assessment (TEA) offer opportunities for the integration of summative assessments with formative practices?

Q: How can students make better connections between assessment and learning?

This paper considers the following:

- Current thinking on formative and summative assessment
- The benefits of integrating assessments
- Systems for integrating assessments
- Students as active participants
- Risks and challenges

Key recommendations

- Further research is needed to explore how technology-enhanced integration of formative and summative assessments can be used, particularly in educational settings beyond higher education.
- The educational technology industry should work closely with teachers, students and researchers on the future designs of digital environments to integrate formative and summative assessment activities.
- Policy makers should recognise the value of integrating formative and summative assessment and offer a policy-level commitment to working with practitioners and researchers to re-imagine the future of assessment.

Whilst formative and summative assessments serve distinct educational purposes they do not necessarily need to be seen as exclusive processes

Current thinking on formative and summative assessment

Both formative and summative assessments are deeply embedded in current education systems. However, whilst formative and summative assessments serve distinct educational purposes they do not necessarily need to be seen as exclusive processes.

Summative assessment is seen as assessment of learning and results in an accreditation and judgement of the learner. Formative assessment is known as assessment for learning. It provides ongoing feedback to teachers and learners to support learning and progress.

The outcomes of summative assessments such as national standardised tests, are used to grade individual students and also to provide data for monitoring performance at educator, institution and national level as part of political drives for increasing standards in education. Education systems and policies prioritise these high-stakes assessments. However, summative assessment has been criticised for simply measuring students' recall of learned facts rather than providing a useful reflection of learning. This hampers effective learning by emphasising grades, leading to high levels of pressure on students and teachers. In turn this results in over-reliance on transmission pedagogies and 'teaching to the test'.[1]

Formative assessment is more aligned to current theories of learning. This reflects a move away from knowledge transmission and positions the learner as an active agent in the learning process. Formative assessment practices are designed to be an integral part of the learning experience and support students to understand their progress. A significant body of research has demonstrated that formative assessment promotes better learning outcomes, increased learner motivation and deeper understanding of content.[2] Yet, summative assessments remain disconnected, leading to questions over relevance and integrity.

The benefits of integrating assessments

The integration of summative assessments with formative practices can make the assessment process more meaningful for students by providing regular feedback that supports learning whilst also contributing towards an overall picture of their learning. Integrating summative assessment into the learning process can also make it more authentic. There is now the potential to track and trace individual progress, aggregate data, provide immediate feedback and create new multimedia platforms for feedback and review. Innovative initiatives are beginning to demonstrate the potential of technology-enhanced assessment for integrating formative and multi-level summative assessments.

The integration of assessments facilitates the accumulation of evidence which can be used for both formative and summative purposes over time, reducing 'teaching to the test'. Integrated assessment practices can also help learners to understand connections between learning and assessment. Developing students' active involvement as assessors of their own learning supports them in life-long learning beyond formal education.[3]

Systems for integrating assessments

Summative assessments, such as national tests, usually take place outside of classroom activities and teacher control, because of the need to ensure equitable opportunities through standardised testing. Well-designed TEA systems have the potential to perform both formative assessment functions and reliable benchmark testing. The e-asTTle project in New Zealand[4] is an online assessment tool developed to assess students' achievement and progress in reading, mathematics and writing. The system allows teachers to set tests flexibly, at the required level, record and measure student progress over time. While meeting national standardised requirements, the system also provides rich feedback for teachers on specific aspects of student performance and so supports both assessment for learning and assessment of learning.

Technology also supports the use of summative assessments for formative purposes, enabling traditional testing methods to be used in more meaningful ways. The use of multiple choice questions (MCQs) for example, is most commonly associated with testing the recall of facts with no associated elements of useful feedback or learning

1 Baum, D. And Associates (2010) *Assessment 2020: Seven Propositions for assessment reform in higher education*. Sydney: Australian Learning and Teaching Council assessmentfutures.com and Harlen, W. (2005) Teachers' summative practices and assessment for learning – tensions and synergies. The Curriculum Journal, Vol. 16, No. 2, June 2005, pp. 207-223.

2 See Black, P., and Wiliam, D. (1998) *Inside the black box: Raising standards through classroom assessment*. London: King's College.

3 Boud, D. & Falchikov (2006) Aligning assessment with long-term learning. Assessment & Evaluation in Higher Education, Vol 31, (4), 399-413.

4 The e-asTTLE project: e-asttle.tki.org.nz

Ohio University Library: flickr.com/ohiouniversitylibraries

interaction. When combined with the use of digital communication tools, MCQs can prompt new ways of activating assessment for learning.[5] Carefully chosen MCQs answered by learners via mobile devices or electronic voting systems (EVS)[6] can be used by educators to identify alternative or comparative understandings and provides students with real-time feedback. These combined tools can also be used to promote collaborative interaction and reflection.

Students as active participants in integrated assessment activities

For effective learning, students need to be actively involved in feedback processes rather than passive receivers of information about their progress. Self-assessment and peer-assessment have been shown to improve learning outcomes through students' reflecting on and revising their own and peers' work.[7]

Web 2.0 technologies can promote information sharing, media creation and collaborative knowledge building. These are beginning to be used to support students' active participation in integrated systems of formative and summative assessments. The 'netfolio' system enables e-portfolios to be shared so that a collective body of assessment evidence can be developed by learners. The system facilitates formative feedback via peer assessment, teacher individual assessment and on-going collection of evidence that builds towards a summative grade.[8]

In another example, the idea of 'crowdsourced grading' has been developed. Web 2.0-enabled collaborative and social learning are incorporated into the assessment on a university course. Assessment is based on earning points via 'crowdsourcing' weekly, peer evaluations of student blogs. Overall course outcomes are determined by this peer review and teacher commentary.[9]

Risks and challenges of a more integrated approach

Innovation in assessment can be perceived as 'risky' by both policy makers and practitioners. Barriers at policy level to the integration of assessments include trust in the objectivity of formal testing, a belief in school league tables and the market model of education.[10] These translate, at school level, into concerns over validity and reliability of new methods, lack of teacher development and teachers' uncertainties around their roles as assessors.[11] The availability of professional development for teachers is therefore critical to success.

The use of technology to support the integration of formative and summative assessments is an emerging field and most research has focused on higher education. Technology alone cannot transform assessment practices and the role of the teacher remains of central importance in all educational innovations. This is particularly important in harnessing technology to make assessment more relevant and related to learners' achievements and progress. Digital tools should be designed to support integrated assessment practices that are relevant and appropriate to the context, to the learners and the changing world in which we live.

Innovative initiatives are beginning to demonstrate the potential of technology-enhanced assessment for integrating formative and multi-level summative assessments

5 Whitelock, D. (2010) 'Activating Assessment for Learning: are we on the way with Web 2.0?' In Lee, M.J.W. and McLoughlin, C. (Eds.) *Web 2.0-Based-E-Learning: Applying Social Informatics for Tertiary Teaching*. IGI Global. pp. 319–342.

6 Electronic voting systems (EVS) employ specially designed hand held devices to allow individuals or groups to respond instantly and/or anonymously to questions or polls with the results displayed in real-time for the whole group to see.

7 Nicol, D. and Macfarlane-Dick, D. (2006) 'Formative assessment and self-regulated learning: A model and seven principles of good feedback practice'. *Studies in Higher Education*, 31 (2), pp. 199-218.

8 Barbera 2009 cited in Whitelock, D. (2010) 'Activating Assessment for Learning: are we on the way with Web 2.0?' In Lee, M.J.W. and McLoughlin, C. (Eds.) *Web 2.0-Based-E-Learning: Applying Social Informatics for Tertiary Teaching*. IGI Global. pp. 319–342.

9 Crowdsourcing refers to the (mainly) internet-based practice of outsourcing a job or a problem needing a solution to the 'crowd' or web audience and enabling them to respond. See Cathy Davidson's blog: hastac.org/blogs/cathy-davidson/how-crowdsource-grading

10 Black, P. & Wiliam, D. (2005): Lessons from around the world: how policies, politics and cultures constrain and afford assessment practices, *Curriculum Journal*, 16:2, 249-261.

11 Black, P. and Wiliam, D. (2006) Assessment for Learning in the Classroom. In Gardner, J. (ed) Assessment and Learning. London: Sage.

Rethinking Assessment

2012/2013 Series of discussion papers

2. Integrating the formative and summative through technology enhanced assessment

Case study:
Quest Atlantis

The virtual environment Quest Atlantis[12] uses a game-based design to support inquiry-based learning in ecological sciences. Students aged 9–16 undertake quests, including online and off-line activities, with storylines intended to inspire social action. Teachers design and initiate quests. They also give feedback online and capture assessment data, all through the medium of the game. An online teacher toolkit helps manage all student progress and submissions.

A recent study found that classes using Quest Atlantis showed larger gains in understanding and achievement than those that did not. Students who engaged more with the environment's formative feedback showed even greater gains.[13]

12 atlantisremixed.org

13 Hickey, D.T., Ingram-Goble, A.A., and Jameson, E.M. (2009) 'Designing Assessments and Assessing Designs in Virtual Educational Environments'. Journal of Science Education and Technology, 18, pp. 187-208.

Assessment is universally recognised as one of the most important – and powerful – elements of an educational experience. It is also seen as one of the hardest to reform. However, there is an increasingly accepted need for rethinking assessment if it is to keep up with current theoretical, cultural and technological developments affecting teaching and learning.

Digital technologies open up new possibilities for more personalised, immediate and engaging assessment experiences. However, the use of digital technologies for assessment (referred to as 'technology-enhanced assessment') has yet to be 'transformative', with current practices either replicating traditional assessment methods or manifesting in pockets of innovation that are not widespread.

How the potential of digital technologies can best support improved assessment practices and preferred educational outcomes is becoming an issue of increasing importance. An acknowledgement of the potential that digital technologies offer should recognise the complexity of the task, the many factors affecting successful educational change, and the significant ethical questions raised by the use of digital technologies in assessment.

This series of discussion papers draw on a substantial review of literature which aimed to identify the different ways in which technology currently impacts on educational assessment practices and how it could contribute to a new vision for assessment.

The review of literature is available at:
bristol.ac.uk/education/research/sites/tea

The following discussion papers have been produced in order to highlight key issues and questions identified by the review of literature:

Paper 1: Transforming education through technology enhanced assessment
Paper 2: Integrating the formative and summative through technology enhanced assessment
Paper 3: Exploiting the collaborative potential of technology enhanced assessment in Higher Education
Paper 4: Learning analytics and technology enhanced assessment
Paper 5: Ethical issues in technology enhanced assessment
Paper 6: National standards and technology enhanced assessment

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